

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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SECURITY INFORMATION

50x1

COUNTRY USSR (Leningrad Oblast)

REPORT

SUBJECT Activities of the Servo-Mechanism Group of the Control and Computing Laboratories of NII 49, Leningrad

DATE DISTR.

3 September 1953

DATE OF INFO.

REQUIREMENT

50X1

PLACE ACQUIRED

REFERENCES

• 1988 •

50X1-HUM

THE SOURCE EVALUATIONS IN THIS REPORT ARE DEFINITIVE.
THE APPRAISAL OF CONTENT IS TENTATIVE.
(FOR KEY SEE REVERSE)

50X1-HUM

1.

2. Paragraph 1, Klaritski should probably be Klaritskiy. Paragraph 8, Lawitscka has also been reported as Lavitschka and Lawitschka, Hans.

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50X1-HUM

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NO. OF PAGES 3

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(LISTED BELOW)DATE
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THIS IS UNEVALUATED INFORMATION

50X1-HUM

Q. The special instruments subgroup of Radar Laboratory #10 was dissolved in the summer of 1949, and Dr. WOLFF, Ing. NIELBOCK were transferred to the servo-mechanism section of the control and computing devices laboratory. The scientific and technical head of this group was Ing. Herbert MUMMERT. KLARITZKI was the Soviet administrative head of the group. This group was divided into several sections. There was a development section under the leadership of Dr. Heinrich KINDLER, a design section under Ing. LANGENBACH, and an assembly and operational section headed by Ing. LAEKMAEKER. A mathematical consultant whose name was Dr. Karl BONGEL was also in the group. The personnel of Radar Laboratory #10 were not assigned to any one particular section in the MUMMERT group, but were loosely associated with all of the sections. They reported generally to KLARITZKI.

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2. The first project the servo-mechanism group worked on was the 50X1-HUM continuation of a project [redacted] assigned while with Radar Laboratory #10. [redacted] computations for a dielectric constant and dissipation factor measuring device. The device was for measurements at the 10 centimeter band. This instrument never even progressed to a completed circuit design. [redacted] turned the computations over to the Radar Laboratory #10 and never even heard anymore about it. 50X1-HUM 10⁻³ were to be measured from 1 to 100, and tan delta from 10 to 10⁻³. The device was to have been used for the examination of 50X1-HUM materials at UHF for very high capacity condensers for possible radar installation uses. No details of this possible radar installation were made available to the Germans. [redacted] worked on this project for about two or three weeks. 50X1-HUM

3. After the project was completed, Dr. WOLFF [redacted] did absolutely nothing for six months. [redacted] simply reported for work and passed the time away.

[redacted] the Soviets had no real reason for assigning 50X1-HUM to this section, and simply put [redacted] there to get [redacted] out of Radar Laboratory #10. 50X1-HUM

[redacted] the MUMMERT group [redacted] were working on electro-mechanical problems connected with computers. 50X1-HUM

[redacted] During the end [redacted] 50X1-HUM [redacted] one completed computer which [redacted] had been completed by the MUMMERT group about 1950. 50X1-HUM

[redacted] In size it occupied a space about 2 x 2 x [redacted] 50X1-HUM meters. 50X1-HUM

50X1-HUM

4. Finally Dr. WOLFF went to KLARITZKI and asked if he [redacted] could work on computers. KLARITZKI said we could not be assigned to any work of this sort. However, in about a month, he called in Dr. WOLFF and told him that he, NIELBOCK [redacted] should solve a particular problem 50X1-HUM computing and control laboratory by purely electronic, instead of electromechanical means, as had been done to date. This problem was the determination of the sine of an angle from a determination of the angle itself. No specifications were furnished Dr. WOLFF about the eventual use of this development, but it obviously was for a computer of some sort. Dr. WOLFF [redacted] felt that the Soviets had more or less assigned [redacted] this project as "busy work" in an attempt to keep [redacted] occupied. Enclosure (A) represents the circuit diagram of this computer. 50X1-HUM

5. [redacted] next designed a DC vacuum tube voltmeter, more or less as [redacted] 50X1-HUM private project. This had an input impedance of 10¹⁰ ohms. It utilized a center zero, mirror scale 200 microampere movement which had a two percent of full scale accuracy. Its internal resistance was 850 ohms. The lowest measuring range of the voltmeter was 0 to 100 microvolts. Enclosure (B) shows the circuit diagram of this device. 50X1-HUM

50X1-HUM

6. The same material difficulties plagued [redacted] in the servo-mechanism group as in Radar Laboratory #10, although to not quite the same degree, since [redacted] now beginning to receive components of Soviet manufacture in greater quantity. The 200 microampere basic electrical meter movement described in paragraph 5/ was the most sensitive movement (current [redacted] of Soviet manufacture. This was first encountered in July of 1950 and it was really of excellent design and manufacture. [redacted]

The computer [redacted] mentioned in paragraph 3/ did not incorporate the all-electronic determination of sin θ developed by Dr. WOLFF [redacted]

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7. [redacted] During 1952 [redacted] no assigned projects [redacted] and only had to report to work on time. [redacted] spent the rest of 50X1-HUM [redacted] time building various personal projects, such as television sets, etc.

8. STATESNY and MENSEN were still in Leningrad. [redacted] they 50X1-HUM were not, in February 1953, or for some time previous to that date, working for the Soviets. MUMMERT was still in Leningrad and working 50X1 at NII-49 [redacted] LAWITSOKA [redacted] 50X1 visited the STATESNY apartment group. 50X1-HUM

9. [redacted] Soviet Sector of Berlin [redacted] the Scientific and Technical Office of Instrumentation. Dr. WELLER was the German technical head, and the German administrative chief was SCHLAGEL. POGARDIN, was the Soviet head. [redacted] carrying on development work in dm band instrumentation, and [redacted] output power meter. 50X1-HUM [redacted] 50X1-HUM

[redacted] **Comments:** This report, paragraph 5, contains the first information [redacted] that the Soviets can commercially produce a basic electrical meter movement of greater current sensitivity than 1 milliamper full scale. It should be noted that this instrument was first encountered in the summer of 1950. The internal resistance seems very low for a current sensitivity of this magnitude, and indicates a rather high degree of design and manufacturing skill. The computer [redacted] mentioned in paragraph 2 must have 50X1-HUM been a fire control device.

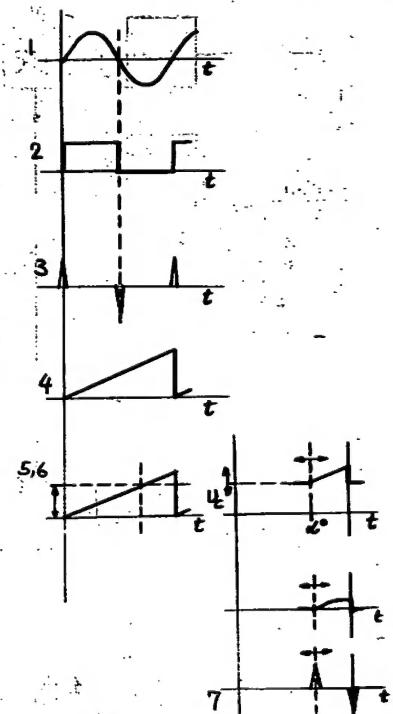
ENCLOSURE (A): Circuit Diagram, SIN θ Computer.

ENCLOSURE (B): Circuit Diagram of DC Vacuum Tube Voltmeter.

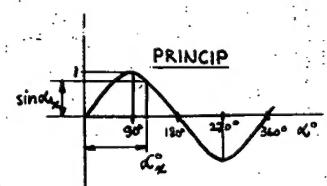
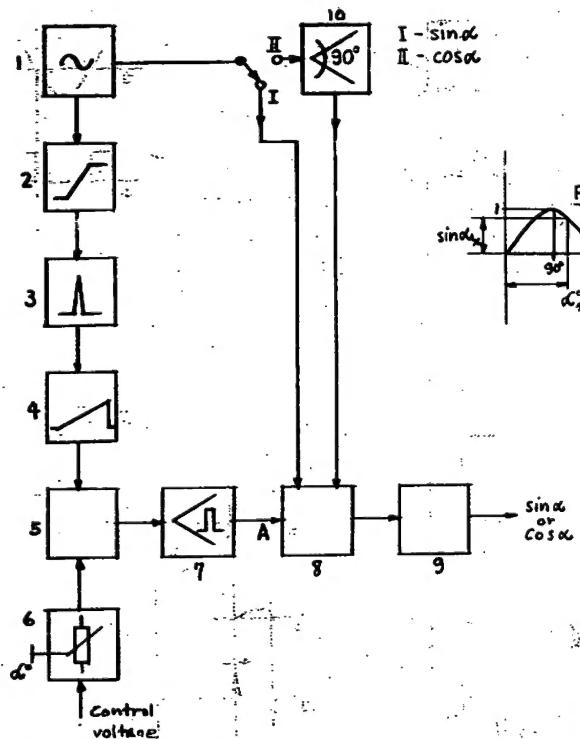
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Enclosure (A) page 1 of 4
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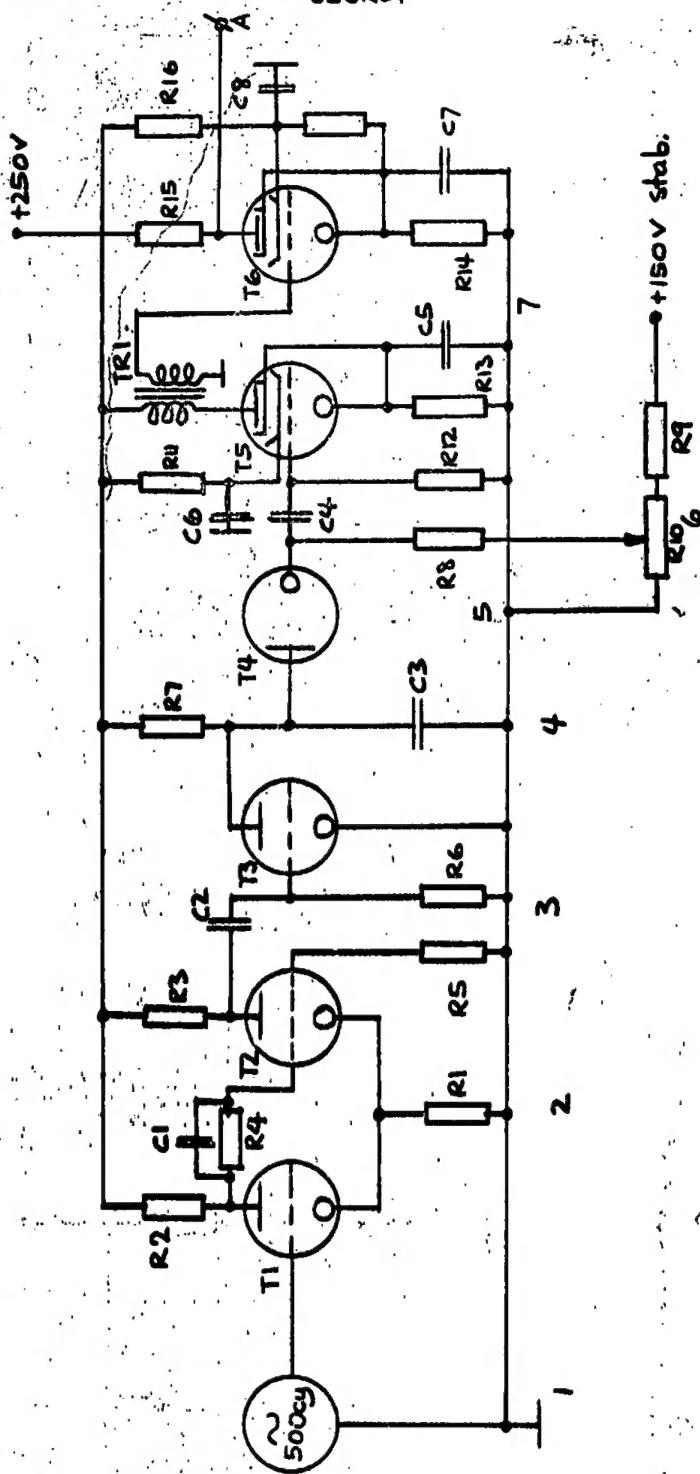
CIRCUIT DIAGRAM - SINE COMPUTER



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Circuit Diagram - Sin θ computer

Enclosure (A) page 2 of 4

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Enclosure (A)
Page 3 of 4 pagesLEGEND TO THE SKETCHES OF THE SIN & COMPUTER

Impulse scheduling and block diagram.

The accuracy of the instrument depends first on the distortion factor of the sin wave generator.

Second, it depends on the linearity of the time base. Third, it depends on the accuracy of setting of the transmitting potentiometer.

Tests were made without taking the accuracy of the calculation into consideration. In the first place the practicability of the instrument was to be examined. For the breadboard model the following reference sin wave voltage was used:

- (a) a power frequency of 50 cps.
- (b) an audio generator (beat frequency generator, giving 500 cps).

Figure 2 was used.

The generator for the reference frequency in the finished stage should have been a 500 cps source, with a small distortion factor (which was to have been developed separately). The RC time base (4) should have been replaced in the finished product by one of greater linearity (Phantastron). The total diagram corresponds in principle to a time modulation circuit of great accuracy.

Shown on Figure No.1

1. Sin wave generator
2. Limiter
3. Differential stage
4. Linear time bases (saw tooth) initially an RC circuit with switching tube
5. Compensation stage
6. Precision transmission potentiometer, scale for setting of θ value 0 to 270 degrees.
7. Impulse amplifier (A) amplifier output
8. Coincidence stage (gated pentode)
9. Peak voltage stage
10. 90 degree phase shifter for cosine function

Shown on Figure No. 2

- R1 = 1,000 ohms
- R2 = 10,000 ohms
- R3 = 10,000 ohms
- R4 = ?
- R5 = 100,000 ohms
- R6 = 10,000 ohms
- R7 = approx. 1,000 to 2,000 ohms
- R8 = 10,000 ohms
- R9 = 20,000 ohms
- R10 = special potentiometer, 5,000 ohms
- R11 = 120,000 ohms
- R12 = 100,000 ohms

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Enclosure (A)
Page 4 of 4 Pages

R13 = 300,000 ohms
R14 = approx. 10,000 ohms
R15 = 100,000 ohms
R16 = 160,000 ohms
R17 = 150,000 ohms

C1 = ?
C2 = .50 uuf
C3 = ?
C4 = ?
C5 = 0.01 uuf
C6 = 0.01 uuf
C7 = 0.01 uuf
C8 = 0.01 uuf

T1 and T2 = double triode, 6SN7
T3 = triode, 6J5
T4 = $\frac{1}{2}$ diode 6H6
T5 = pentode 6AG7
T6 = pentode 6AG7
TR1 = transformer, normal core, Fe cross-section, 19 x 19 millimeter.

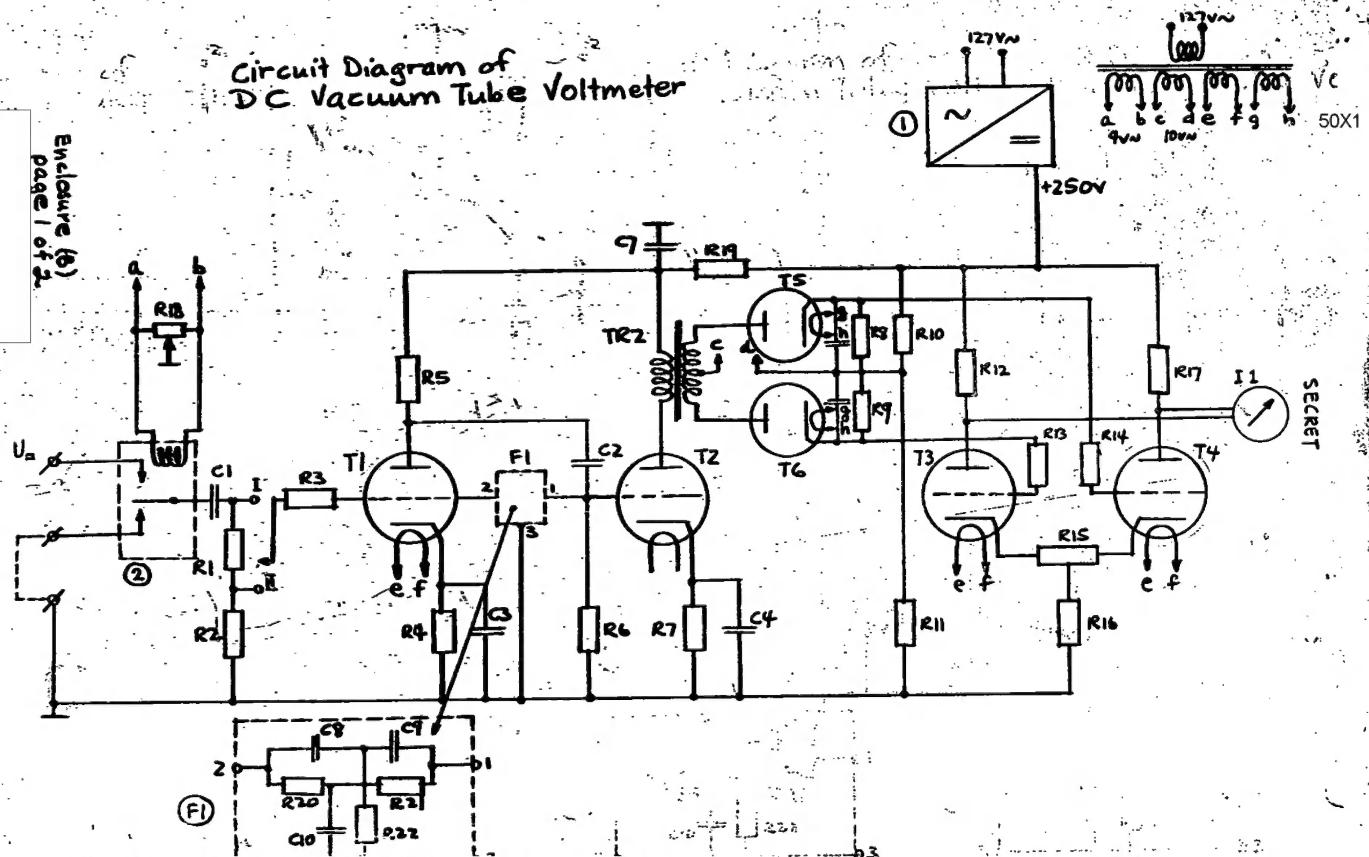
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Enclosure (b)
page 1 of 2

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Circuit Diagram of D.C. Vacuum Tube Voltmeter



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Enclosure (B)
Page 2 of 2 PagesLEGEND TO THE SKETCH OF THE DC VACUUM TUBE VOLTMETER

(1) Normal power supply with filter. Full wave rectifier tube, 6 x 5 (Soviet copy), plate DC voltage equal plus 250 volts. Transformer TRL for all filament supply.

(2) Telegraph relay used as chopper (Soviet copy of Siemens relay).

Supply given by a, b, equal 4 volts, 50 cps

C1 = 0.25 uf

R1 and R2 = input voltage divider, calibrated for range 1 = 1 mV
range 2 = 10 mV

Total value R1 plus R2 approx. equal 1 megohm.

S1 = range selection switch

R3 = approx. 500,000 ohms

T1 and T2 = double diode 6SL7

2 stage selective amplifier for 50 cps operation

R4 = 10,000 ohms

R5 = 250,000 ohms

C3 = 25 uf, 20 volts, electrolytic condenser

F1 = double T filter with anti-resonance at 50 cps contains elements:

R20 = 3 megohm

R21 = 3 megohm

R22 = 1.5 megohm

C8 and C9 = unknown

C10 = unknown

Filter as closed unit in shielded cage

C2 = 0.25 uf

R6 = approx. 500,000 ohms

R7 = 1,000 ohms

C4 = 100 uf, 20 volts, electrolytic condenser

TR2 = plate transformer, iron cross-section 16 x 16 mm. normal core, primary winding.

secondary, 2 x 24,000 turns, center tapped.

T5 and T6 = double diode, 6H6 (Soviet copy of RCA) phase discriminator
c and d = carrier voltage

(3) 2 stage selective amplifier for 50 cps operation

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